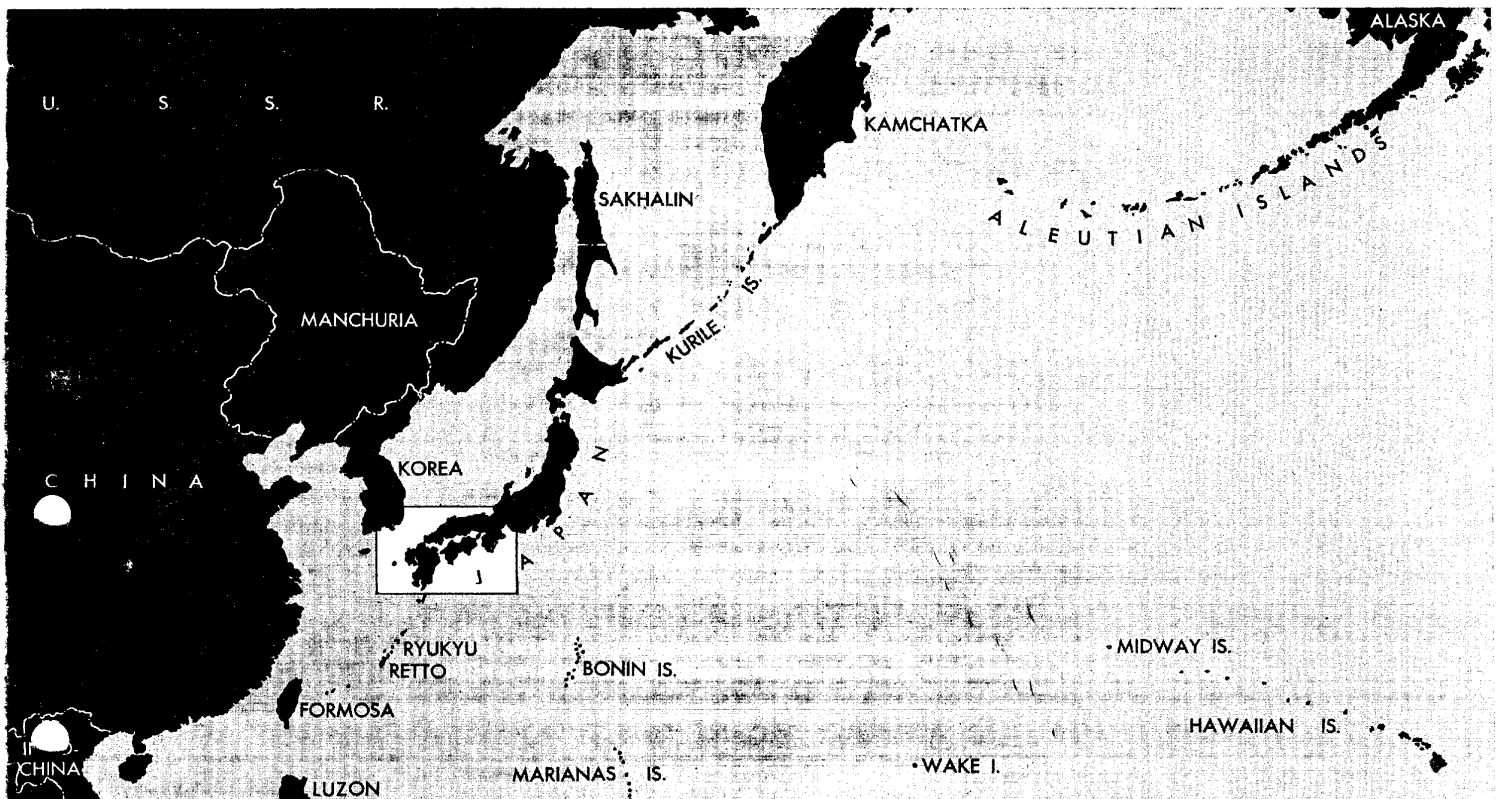


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CHAPTER XI

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JOINT ARMY-NAVY INTELLIGENCE STUDY

OF

SOUTHWEST JAPAN:

Kyūshū, Shikoku, and Southwestern Honshū

HEALTH AND SANITATION

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Chapter XI

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HEALTH AND SANITATION

110. General Description

For purposes of administration of governmental functions, including public health protection, Japan proper is subdivided into 47 prefectures or Ken, including 3 city governments (Tōkyo, Kyōto, and Ōsaka). Southwest Japan contains 24 of these prefectures, including 2 city governments (Ōsaka, Kyōto) and the greater part of 1 prefecture (Gifu). For geographic convenience and, as a war measure, to provide a certain amount of decentralization, these prefectures are again grouped into larger regional units (so-called Economic Blocs) which are administered by a cooperative council of prefectural governors under the chairmanship of 1 of the prefectural governors concerned. These regions are:

Kyūshū, with 7 prefectures.

Shikoku, with 4 prefectures.

Chūgoku on Honshū, with 5 prefectures.

Kinki on Honshū, with 6 prefectures.

Tōkaidō on Honshū, with 4 prefectures, of which 2 and the greater part of 1 are included in this survey.

Water is found in abundant quantities in most of the area of Japan covered in this survey. However, during the latter part of the summer there are likely to be shortages in a few areas. Adequate filtering and chlorination facilities are found only in larger cities.

Sewerage systems have been established only in large cities. Open sewers or gutters are used to carry off liquid wastes in all other settlements. Night soil is usually collected in buckets at weekly and longer intervals and used for fertilization.

Among the vectors of disease are a number of mosquitoes (*Anopheles*, *Culicidae*, and *Aedes* species), the common house fly, the sandfly, fleas, lice, mites, and rats.

With the exception of a poisonous adder species, no dangerous animals occur in the region surveyed.

A rich flora of subtropical type is found in the entire area, assuming an almost tropical character near the southern tip of Kyūshū. The staple foods are rice and fish. Many articles of food must be imported from abroad, as the domestic supply is inadequate to meet fully the needs of the native people. The prevailing method of fertilization necessitates a thorough cooking of vegetables and washing or cooking of fruits. Fish are frequently infected with flukes or other parasites. The dairy industry is small, and some of the cattle are used for slaughter.

The Japanese health service is well organized and efficient. During recent years there have been many advances in the field of sanitation, preventive medicine, and personal hygiene, but in the rural areas the standards still remain somewhat backward.

Hospitals similar to those found in the western world are established in the larger cities. The hospitals connected with the medical schools compare favorably both in reputation and in equipment with the teaching hospitals in Europe. There are approximately 62,000 physicians, 22,000 dentists, 60,000 midwives, 124,000 nurses, and 17,000 veterinarians in the whole of Japan. Various governmental and private organizations for

medical relief work exist. Social legislation concerning health insurance is under way.

The principal communicable diseases of Japan are the following: acute respiratory and infectious diseases (diphtheria, influenza, smallpox, scarlet fever, cerebrospinal meningitis, measles, pneumonia, whooping cough, encephalitis lethargica [sleeping sickness], acute anterior poliomyelitis); intestinal infections (typhoid fever, paratyphoid fever, amoebic dysentery, bacillary dysentery, and cholera); venereal diseases (syphilis, gonorrhea and chancroid); the insect-borne diseases (malaria, filariasis, dengue fever, plague, epidemic typhus fever, Japanese river fever [scrub typhus fever, tsutsugamushi disease], and louse-borne relapsing fever); several forms of leptospirosis, including rat-bite fever (sodoku); many kinds of worm and fluke infections, including schistosomiasis (Katayama disease); diseases of the skin, including the various fungus infections and scabies; leprosy; tuberculosis; actinomycosis; anthrax; tetanus; rabies; trachoma. Of these diseases, the insect-borne diseases, venereal diseases, intestinal infections, schistosomiasis, and the skin diseases will be the most important to white troops entering the country. The acute respiratory and infectious disease rates are somewhat similar to those found in the continental United States. Although the *Aedes aegypti* mosquito is found in Japan, yellow fever has never been known to occur.

111. Environment

A. Water.

Although water is found in ample quantities in most of Japan, there are likely to be shortages in some areas during the latter part of summer. In rural districts the quality of drinking water is often good and the supply abundant, especially in the mountainous districts where water is obtained from mountain streams either directly or through simple filter equipment. All well water should be tested before it is used for drinking purposes. An investigation in rural districts made by the Home Office showed 45.5% of the drinking water supplies to be chemically wholesome.

In the larger cities adequate facilities for filtration and chlorination are found. Most of the waterworks use slow sand filters; others use the rapid sand filtration method. Bacteriological examinations are made at regular intervals. The largest number of bacteria before filtration was found to be 5,374 per 1 cc., the smallest, 2 per 1 cc. Examination after filtration showed only 1 instance with more than 50 bacteria per 1 cc. Nevertheless, the prevailing high rate of intestinal diseases is interpreted by some observers to indicate that in many instances the water purification is not as efficient as the government records would seem to indicate. Explosive epidemics of typhoid fever or dysentery occurring sporadically in large cities can be traced to inadequacies of filtration or purification facilities (e. g. typhoid fever epidemic in Nagasaki, 1931; dysentery epidemic in Ōmuta, 1938). The highest hardness was found to be 4.978 German hardness, (90 parts per million,

4.95 grains per gallon), and the lowest, 0.5 (9 parts per million, 0.5 grains per gallon).

According to the 1936 statistics the largest quantity supplied per capita per diem was 360 liters (95 gallons) in Tsu; the smallest, 64 liters (17 gallons) in Yokosuka. In the latest statistics available (for 1937, published in 1940) the smallest quantity is 61 liters (16 gallons) in Minamata, Kumamoto prefecture, the largest, 381 liters (100 gallons) in Tsu. Generally in cities and towns 100 to 200 liters (26 to 53 gallons) are common figures.

A survey of these official statistics on waterworks shows that the per capita supply is in many cases substantially greater than originally planned. As an example, the planned supply for Nagasaki is 89 liters (24.4 gallons) per capita per diem, whereas the actual supply was 118 liters (31.2 gallons) in 1936, and 109 liters (28.8 gallons) in 1937. This is generally because of the large number of households which depend upon dug wells.

A comparison of the 2 latest reports (for 1936 and 1937) reveals a decrease in the number of cities in which the actual per capita per diem supply exceeded the planned supply. These trends are due to the general increase in population as well as to the extension of the water supply to buildings and households not previously supplied by the waterworks.

According to the "Waterworks Law" of 1890, still in force, waterworks are constructed and maintained at the expense of the municipalities concerned. In the event that these are unable to bear the expense, permission to construct the works is given to other agencies with the condition that when the term of permission or lease expires, the cities, towns, or villages concerned may purchase the works and the land required for proper operation. The Ministry of Health has the power to order the cities to construct waterworks if this is deemed necessary.

The number of waterworks in Japan proper was as follows:

WATERWORKS IN JAPAN PROPER, 1937 AND 1938

	1937	1938
Cities	117	119
Towns and villages	367	380
Town or village association	7	8
Prefectures	4	3
Private enterprise	108	117
Total	603	627

The sources of the water for these waterworks (1937) were:

Rivers	457
Springs	82
Reservoirs	36
Wells	16
Lakes	12
Total	603

B. Waste disposal.

(1) Human excreta.

A typical Japanese privy consists of a platform provided with a slit and mounted over a pit or cesspool. The pit may be lined with wood, masonry, or concrete. In addition, urinals are in use.

The night-soil is removed at intervals varying between one and several weeks. A long ladle is used to empty the pit into a number of wooden buckets which are carted away to distribute the night-soil for fertilization.

In cities and larger towns the workmen attending to this

belong to a special guild of night-soil collectors. All through Japan human excreta are looked upon as valuable manure and, except in the cities where the amount is in excess of that required for fertilizing the neighboring land, the farmers are ready to buy it and to attend to its removal. In some cities the municipal authorities do the removal but in others the property owner or tenant makes a contract with the local night-soil merchant. Where the supply exceeds the demand, the residents have to pay a removal fee.

As a rule the privies are kept in a rather clean condition and are not unduly offensive. Western style toilets are very few and are found only in the larger cities. Many flush toilets are not connected with the sewerage systems. In 1938 in Japan proper there were 83,885 toilets connected with sewerage systems and 19,276 toilets not connected with a sewerage system but having their own treatment systems.

The private systems are for the most part simple septic tanks with or without the addition of soil absorption fields. Several patterns are in use. The Bureau of Sanitation claims to have proved that decomposition of human excreta after 3 months destroys practically all pathogenic bacteria and parasites.

(2) Waste garbage and sewage.

The present system for the disposal of waste garbage and sewage is enforced according to the law of 1900. This law requires cities, as well as towns and villages, designated by local governors, to remove and dispose of such waste in order to maintain cleanliness of the land and of the dwellings.

Sewerage under the Japanese law means drain pipe sewers and their accessories. These are laid with the object of draining the rain water and foul water in order to keep the ground clean. Where sewerage systems have been constructed, it is the duty of the property owner, user, or tenant to make provision for the draining of his land or his premises and to make the necessary connection between his drain and the sewer.

In 1940 there were in the whole of Japan more than 70 municipalities equipped with sewage disposal systems. Information on the methods employed to dispose of the sewage is fragmentary. Mentioned in some of the statistics are the activated sludge process, a rapid sedimentation process, a filtration process, and direct drainage into rivers or the sea. Where the sedimentation process has been adopted, the dried sludge is used for filling low areas of land and as an ingredient of fertilizers.

The relatively small number of sewerage systems can be attributed to the fact that most municipalities had or have gutters which, though not entirely satisfactory, serve fairly well for the drawing off of liquid wastes. The state is encouraging the general construction of sewers by making grants from the treasury amounting to $\frac{1}{3}$ of the cost of construction. In 1938, 432,320 yen were thus granted for the construction of new sewerage systems.

In 1940 in Southwest Japan, sewerage systems were reported as operating in the following centers: Beppu, Fukuoka, Kagoshima, Kokura, Kumamoto, Kurume, Miyazaki, Oita, Wakanatsu, and Yawata, in Kyūshū; Imabari, Matsuyama, and Yawatahama, in Shikoku; Hiroshima, Kure, Okayama, Onomichi, Shimonoseki, Tottori, and Yonago, in Chūgoku; Akashi, Amagasaki, Fuso, Kōbe, Kyōto, Nara, Nishinomiya, Ōsaka, Sakai, and Wakayama, in Kinki; and Gifu, Tchinomiya, Nagoya, Okazaki, Toyohashi, and Tsu, in Tokaido.

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It must be assumed that a number of additional cities and towns have since been provided with sewerage systems. For the disposal of rubbish and garbage in localities where the law applies, tenants are required to place collected rubbish in a receptacle prepared for this purpose. The municipality must then transport it to a fixed place and dispose of it by burning, burial, or by other methods deemed not injurious to health. Among these cities and towns a number have special facilities for burning rubbish while others burn it in the open. The remainder resort to various methods of disposal such as using the garbage for fertilizer, employing it for reclaiming shore, river, and swamp lands, and using it as food for fowl and pigs. For the 146 cities operating under the law of 1900, records were available for 1937. Of the 4,795,225 houses, 2,735,838 were required to remove wastes and 152 had incinerator plants.

C. Animals.

(1) Vectors of disease.

(a) *Mosquitoes*. *Anopheles hyrcanus sinensis* is by far the most important vector of malaria in Japan proper, including the region under discussion. It is also regarded as an intermediate host of *Wuchereria bancrofti*. *A. hyrcanus sinensis* breeds in stagnant water containing a fair amount of organic matter, but not in water with a high salt content. Rice paddies represent its favorite breeding grounds and it may also breed along shores of streams and lakes. *A. lindesayi japonicus* is another possible vector of malaria. In addition *A. sinuoides*, *A. koreicus*, and *A. edwardsi* may be found occasionally in the region surveyed, although these forms are said to be mostly confined to the Tokyo district. No evidence concerning their relation to malaria or filariasis is available.

Aedes flavopictus, *Aedes albopictus*, and *Aedes galloisi* are found in the northern part of this territory during the summer months. *Wuchereria bancrofti* is only partly developed in these species which bite in the daytime. *Aedes albopictus* also carries dengue fever. Extending farther south *Aedes albolateralis*, *Aedes togoi*, and *Aedes koreicus* occur and represent suitable vectors for *Wuchereria bancrofti*. *Aedes aegypti* is not found in Japan proper but is reported in Kyūshū and Nihara. It is a vector of yellow fever and dengue fever. Yellow fever has not been recorded in Japan. The significance of *Aedes alboscuteellatus*, *Aedes japonicus*, and others as possible vectors is not established. The *Aedes* species found in Japan are also considered vectors of B encephalitis. This disease is possibly also propagated by various species of *Culex*.

Culex tipuliformis, *Culex quinquefasciatus (fatigans)*, *Culex pipiens*, and *Culex sinensis* are reported and represent suitable carriers for *Wuchereria bancrofti*.

(b) *Flies*. The common house fly, *Musca domestica*, carries the causative organisms of intestinal diseases (typhoid fever, paratyphoid fever, amoebic dysentery, bacillary dysentery, and cholera) from fecal matter to the food of man by purely mechanical means. Although flies are fairly numerous in Japan, they are a lesser nuisance than in China because of an active campaign conducted by the local governments. Various measures for destroying breeding places and catching flies are organized. Provisions are made for the protection of displayed food, foodplants, and commercial kitchens. Official anti-fly propaganda leaflets are distributed from time to time.

More than 10 species of Tabanidae (gad flies, horse flies)

are found in Japan and must be considered as mechanical disease carriers. They are less numerous in the southern part of Japan proper than in northern Japan and Hokkaido.

The sandfly, *Phlebotomus papatasi*, transmits a virus disease known as pappataci or sandfly fever. This disease is said to occur in practically all of the southern portion of the Japanese Empire, but this claim requires further substantiation. Evidence indicates that sandflies are capable of transmitting the organism causing Oriental sore (dermal leishmaniasis) and are also responsible for the spread of kala-azar. These 2 latter diseases are uncommon in the region under discussion.

(c) *Fleas*. Fleas are vectors of at least 2 serious diseases affecting man; namely, plague and the murine (rat) type of typhus fever. The fleas transmit the infection from infected rats to man, as well as from rat to rat. The finding of large numbers of dead rats or other rodents suggests that plague prevails among the local animals. This is of importance because the fleas leave the dying rodent and seek new animal hosts, including man. Thus, by infesting rodents, they may transmit plague and murine typhus. In addition it has been shown that rat fleas act as intermediate hosts for the cysticercoids of dwarf tapeworms (*Hymenolepis diminuta* and *H. fraterna*), which may also infect man, as well as for encapsulated larvae of nematode worms. The following fleas have been identified in Southwest Japan: *Pulex irritans* (man and rodents), *Ceratophyllus anisus* (rat), *Ceratophyllus fasciatus* (rat), *Paradoxopsylla curvispinus* (rat), *Leptopsylla musculi* (rat), *Xenopsylla cheopis* (rat), *Ctenocephalus canis* (dog), *Ctenocephalus felis* (cat). Tapeworm cysticercoids were found in *Ceratophyllus fasciatus* and *Leptopsylla musculi*, nematode larvae in *Xenopsylla cheopis*. The floor mats (tatami) in poorer houses, especially in most farmhouses, contain numerous fleas.

(d) *Cimicidae*. The bed bug (*Cimex lectularius*) is not indigenous in Japan. It may occasionally be found in foreign style hotels in a few port cities.

(e) *Lice*. The body louse, *Pediculus humanus corporis*, carries the epidemic form of typhus fever found in every part of the Japanese Empire. Lice also carry the spirochete *Borrelia recurrentis* causing louse-borne relapsing fever which has the same geographical distribution as epidemic typhus fever. The hair of lower class country girls and even of adult women is often infested with lice.

(f) *Mites*. *Trombidium*, the harvest mite or chigger, is the vector of an important infection of rickettsial origin (*Rickettsia orientalis*), which is known as scrub typhus fever, river fever, or tsutsugamushi disease. The virus in Japan is commonly present in field mice, rats, and voles from which the larval mites get the infection during a blood meal. The virus persists in the mite from the larva of one generation to that of the next. Japanese scrub typhus fever is transmitted by the mite, *Trombidium akamushi*, and occurs on the west coast of northern and middle Japan as well as possibly in southern Japan. The area of prevalence is outside the region under discussion, along the rivers of Niigata-ken, Akita-ken, and Yamagata-ken.

(g) *Rodents*. As hosts to fleas and mites, rats are important in the spread of plague and of several of the typhus fevers. Their excreta may contain the organisms of leptospirosis. Their bite may cause rat-bite fever (sodoku), due to infection with *Borrelia muris (Spirochaeta morsus muris)*. Rats are furthermore hosts of dwarf tapeworms and other

parasitic worms, including *Trichinella spiralis* which may be transmitted to man.

Rats are ubiquitous in Japan. Their breeding is favored by the peculiarities of native style house construction. The spaces between the floor and the ground as well as between the roofs and the ceilings of the wooden houses provide comparatively secure nests, and untidy districts are as a rule completely infested. The various prefectural and local governments are promoting control and extermination measures which prevent an unlimited spreading of the rat nuisance.

Some 32 different species of rats are found in Japan. The most frequently encountered rats are the common black house rat, *Rattus rattus rattus*, the sewer rat, *Rattus norvegicus*, and the roof-rat, *Rattus rattus alexandrinus*.

In the river areas the vole is responsible for the spread of tsutsugamushi disease.

(2) Dangerous animals.

The only dangerous animal likely to be encountered is a poisonous snake, the mamushi adder (*Trigonoccephalus blomhoffi*). Its maximum length extends to about 2 feet although most specimens are much smaller. Its head is triangular, the body is dark brown or earthy in color, and blackish-brown spots appear on both sides of its back. It usually lives in damp places, staying under cover during daytime. Its bite may be fatal but as a rule its poison is not too potent. The country folk look to its boiled flesh as a specific for most diseases.

(3) Pests.

There is a wide distribution of gnats important only as annoying pests. Among these *Simulium japonicum* and *Simulium equinum* are found. *Simulium* species have been incriminated as transmitters of onchocerciasis and tularemia in Africa and in Central America, but such evidence is not available from Japan.

Several species of beetles are known to cause blisters and burns on the skin, resulting in a mild form of dermatitis. *Nanthochroa waterhousei* and *Paederus itae* are mentioned in the Japanese literature. The toxin is cantharidin.

D. Plants.

Plant allergies due to irritating pollen are unknown in Japan. It is claimed that the high humidity, abundant rain, and other meteorologic conditions in Japan prevent the dissemination of light, buoyant pollens, which are those usually considered as excitants of hay fever.

In some persons contact with the haze plant (wax tree) causes a skin rash.

Several species of mushrooms are poisonous.

E. Food.

In the Japanese diet, rice is the most important item. Of this Japan produces approximately 82% and the remaining 18% must be imported, mainly from Korea. Other important items in the diet include wheat, barley, corn, sweet potato, Irish potato, and soy beans. A large proportion of the soy beans must be imported from Manchuria and Korea. Double cropping is carried on in central and southern Japan, barley and wheat being grown in winter. Along the southern shores of Kyūshū and Shikoku rice can be planted twice a year, but the amount of agricultural land is small. Formerly the hulling and polishing

of rice reduced the vitamin value, and the heavy dependence on rice in the Japanese diet caused the prevalence of beriberi which has always been a serious problem in Japan. The present policy is to wash and hull rice only to the extent of 70%. Through the adoption of this method and the admixture of barley to the rice, beriberi has greatly decreased in recent years.

With the basic item of rice, the Japanese serve vegetables, fruits, fish, seafoods, and meat. All vegetables and most fruits must be thoroughly washed and cooked before eating, otherwise there is great danger of contracting the enteric diseases (typhoid fever, paratyphoid fever, bacillary and amoebic dysentery) or one of the many forms of intestinal parasites existing in Japan.

Fish and other sea products are relatively more plentiful in Japan than in other countries, and fish represents one of the basic food items. Excess supplies of fish and sea food can no longer be depended upon because of the wartime curtailment of the fishing industry. Various kinds of fresh water fish and shellfish are frequently infected with flukes and other parasitic worms. The custom of eating some species of fish raw may help spread the fish tapeworm *Diphyllobothrium latum*. Poisonous fishes are found in Japanese waters, the toad fish *Tetraodon maculatum*, being the best known species.

In view of the limited area available for grazing, animal husbandry has advanced slowly, and its possible extension to uncultivated grasslands on mountain slopes is still under discussion. In 1936 there were 1,432,000 horses, 1,771,000 cattle, 1,110,000 pigs, and 353,000 sheep and goats. Meat (beef, pork, mutton, and goat) does not play an important role in Japanese nutrition and is mostly restricted to cities and larger towns where western style cooking (seiyo ryori) is obtainable. The present laws for meat hygiene were adopted in 1906 and are under the administration of the prefectural governors. The control of cattle for slaughter was exercised by 625 sanitation inspectors devoting their full time to this work. The number of slaughterhouses was 721 in 1938. In addition to the meat produced in 1937, Japan imported 13,186,484 kilograms (14,500 tons).

The dairy industry is confined to the environs of the larger cities and to new farm developments in Hokkaido. There is a law for the control of bovine tuberculosis. Milk cows are inspected before their milk may be sold and thereafter at regular intervals. Milk is inspected and containers must state whether they contain whole milk, skim milk, or milk products. Handlers of milk must obtain official permits and be examined for communicable diseases. Pasteurization is performed but its results are considered uncertain by foreign observers.

In addition to cow's milk a certain amount of goat's milk is consumed. Despite attempted improvements in milk production, the importation of dairy products of each type before the war was considerably greater than domestic production.

Statistics on the dairy industry in Japan in 1937 are as follows:

DAIRY INDUSTRY IN JAPAN, 1937

Dairy farms	30,422
Milk plants	6,445
Milk produced	262,314,993 litres (69,400,000 gallons)
Goat dairies	614
Number of goats	6,482
Goat's milk produced	1,575,766 litres (416,000 gallons)
Milk products	
Condensed milk produced	25,733,458 kilograms (28,400 tons)
Condensed skim milk	2,657,680 kilograms (2,930 tons)

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Poultry farming is found in Aichi and Chiba prefectures as well as in Hokkaido. In 1936 chickens to the number of 50,793,000 were reported and a yield of 3,537,000,000 eggs was estimated. Before the war eggs were still imported from China in considerable amounts (valued at approximately 15 million yen annually).

112. Public Health and Medical Facilities

A. Public health organization.

(1) Central organization.

Until 1937 public health administration was under the control of the Ministry of Home Affairs (Naimusho). The Central Sanitary Bureau forming a department of this ministry was subdivided into the 4 following sections: health preservation, chronic disease prevention, acute disease prevention, medical matters.

In 1937 it was decided to create a new ministry, the Ministry of Public Health and Welfare (Koseisho). This ministry was officially organized in 1938 and has since taken over the enlarged duties of the Central Sanitary Bureau. It represents the central administrative organization for public health matters. In 1938 the Ministry of Public Health and Welfare was subdivided into the Secretariat of the Minister; Bureaus of Population, Sanitation, Preventive Medicine, Livelihood, Labor, and Occupations; Research Institutes for Industrial Security, Health Science, and Population Problems; Boards of Insurance, Military Protection, and Wounded Soldiers; and the Government Hygienic Institute. Of special significance for public health matters were the Bureau of Sanitation and of Preventive Medicine (TABLE XI-1).

TABLE XI-1
JAPANESE BUREAU OF SANITATION AND BUREAU
OF PREVENTIVE MEDICINE, 1938

<i>Bureau of Sanitation</i>	
1. Section of Health Maintenance	Concerned with waterworks and sewers, food, beverages, animal husbandry, public sanitation, mineral springs, beaches etc., training of sanitation specialists.
2. Section of Education	Concerned with improvement of health methods, clothing, housing conditions.
3. Medical Section	Concerned with doctors, dentists, nurses, midwives, pharmacists and manufacturers of drugs, medical societies, control of opium, and cultivation of medicinal plants.
<i>Bureau of Preventive Medicine</i>	
1. Section on Eugenics	
2. Section on Preventive Medicine	Concerned with chronic infectious endemic diseases (tuberculosis, trachoma, leprosy, etc.).
3. Section on Quarantine	Concerned with acute communicable diseases, port sanitation, vaccination, and other items of similar nature.

In addition there are advisory councils and field installations (laboratories). The advisory councils are: The Central Board

of Health, the Council for the Investigation of the Japanese Pharmacopoeia, the Council for the Investigation of National Hygiene, and the Opium Commission. The 2 main laboratories are in Tokyo and Osaka.

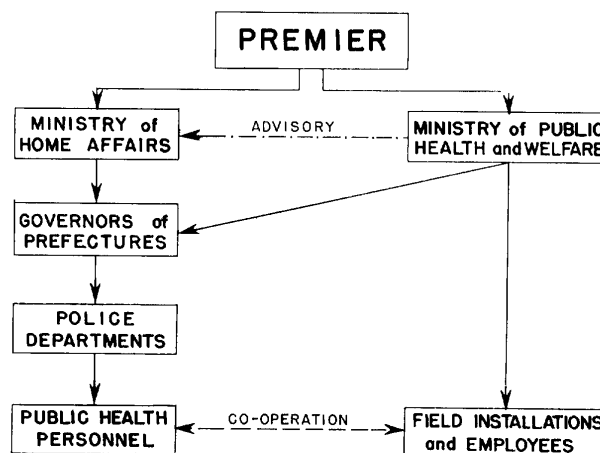
There are also examining bodies which include commissions for the examinations of medical practitioners, dentists, and pharmacists. There is a disciplinary body to which the Ministry of Health refers all pertinent matters for investigation.

(2) Provincial and local organization.

The provincial and local bodies for sanitation administration consist of the prefectural governors, police chiefs, and chiefs of towns and villages. Each prefecture possesses a bureau of sanitation in the department of police. To each of these prefectural offices are attached laboratories staffed with experts in various fields of public health. Sanitary affairs are supervised by the chiefs of police districts. Cities, towns, and villages have authority to adopt local public health ordinances. Cities and larger towns have health departments with laboratories.

Even in village offices there is a sanitation bureau and in each hamlet a special person, the *cisei kumiicho*, is concerned with matters of sanitation. Frequently he is the same person as the hamlet headman (*buraku kokumiacho*). He may hold his office either through election or by a system of rotation. His chief functions are in connection with housecleaning examinations and vaccination. There is also a cemetery overseer. In addition the village office maintains on its rolls a doctor for pre-conscription health examinations and annual smallpox vaccination at the village school. All these functions are only supplementary duties of the persons concerned; the sanitation officers are often regular farmers. The local police assist the village officials in the carrying out of their public health duties and may be called upon to enforce any rules which are not obeyed. FIGURE XI-1 is a tentative schematic representation of the administration of public health within the prefectures.

FIGURE XI-1
ADMINISTRATION OF PUBLIC HEALTH IN JAPANESE
PREFECTURES SINCE 1938



(3) Quarantine organization.

Quarantine is regularly carried out at the principal ports open to foreign trade. In these ports the customs authorities take charge of quarantine procedure. In the Custom Houses there have been established Harbor Master's Offices to which

harbor officers and medical officers are assigned. In Southwest Japan permanent health quarantine organizations have been reported for the following ports: Kuchinotsu, Miike, Moji, Nagasaki, Wakamatsu, Kōbe and Ōsaka.

In case temporary quarantine is found necessary a provisional quarantine station may be established. Such stations come under the supervision of the chief of the police department of the prefecture concerned.

B. Hospitals and medical institutions.

(1) Hospitals.

Hospital facilities in Japan are not as plentiful as in the United States. On the basis of 1932 statistics it has been estimated that Japanese hospitals provide 19 beds per 10,000 people as compared to an average of 97 beds per 10,000 for the United States. In many instances, especially for rural hospitals or small hospitals, the term "bed capacity" is a misnomer. The rooms in such hospitals are very much like rooms in Japanese homes with tatami floors and the bed is made by spreading the bedding (futon) upon the floor. It is, therefore, impossible to determine an accurate figure on the "bed capacity" of the hospitals of Japan directly comparable to figures given for western hospitals. On the other hand, the larger city institutions and university hospitals are as a rule well equipped and use western beds throughout, often to the great discomfort of patients accustomed to the native type of bedding. The hospitals connected with the leading medical schools are on a level comparable both in reputation and in equipment to leading hospitals in the western world. The following list indicates the number of hospitals and clinics in the whole of Japan.

NUMBER OF HOSPITALS IN JAPAN, 1937

	NUMBER	BEDS
Public Hospitals	125	11,548
Private Hospitals	2,907	85,501
Charity Hospitals	46	3,714
Insane Asylums	151	21,325
Tuberculosis Hospitals	116	10,607
Leprosaria	15	5,887
Hospitals for Prostitutes	117*	4,933
Infectious Disease Hospitals	1,000	23,255
Isolation Wards and Houses	7,110	70,955
Clinics for Treating Outpatients	36	838
Dental Clinics for Treating Outpatients	19	586

* Other statistics give 138.

Within the area of Southwest Japan the hospitals included in the 1937 statistics were as follows:

PUBLIC HOSPITALS IN JAPAN BY PREFECTURES, 1937

Kyūshū	NUMBER OF PUBLIC HOSPITALS
Fukuoka	7
Saga	1
Nagasaki	3
Kumamoto	2
Oita	1
Miyazaki	1
Kagoshima	5
Shikoku	
Gokushima	1
Kagawa	1
Ehime	4
Kōchi	—

Chūgoku	
Tottori	1
Shimane	1
Okayama	5
Hiroshima	3
Yamaguchi	—
Kinki	
Shiga	2
Kyōto	2
Hyōgo	8
Nara	—
Wakayama	1
Ōsaka	4
Tōkaidō	
Aichi	4
Mie	2
Gifu	3

(2) Tuberculosis sanatoria.

In 1939 there were 20 public tuberculosis sanatoria in the whole of Japan proper: 1 National Sanatorium in Ibaraki Prefecture, 15 Prefectural Sanatoria, and 4 City Sanatoria.

The distribution of the Prefectural Sanatoria and their bed capacities in 1939 were:

Kumamoto Prefecture (100 beds)
 Oita Prefecture (70 beds)
 Yamaguchi Prefecture (300 beds)
 Okayama Prefecture (235 beds)
 Hyōgo Prefecture (300 beds)
 Ōsaka Urban Prefecture (502 beds)
 Aichi Prefecture (500 beds)
 Mie Prefecture (160 beds)
 Gifu Prefecture (100 beds)
 Municipal Tuberculosis Sanatoria within the area surveyed were in Ōsaka (1200 beds) and Nagoya (750 beds).

(3) Leprosaria.

In 1937, 15 leprosaria were listed. There were 4 national leprosaria of which 1 was located in the Kagoshima prefecture of Kyūshū (Oera village), 4 prefectural leprosaria of which 1 was located in the Kumamoto prefecture of Kyūshū (Aishi village) and 1 in the Kagawa prefecture of Shikoku (Aji village), and 7 private leprosaria.

(4) Medical schools.

There are 9 Imperial Universities (Teikoku Daigaku) in the Japanese Empire, including 1 in Korea (Keijo) and 1 in Formosa (Taihoku), each of which contains a medical faculty. These medical schools have the highest reputation in the country. There are 4 of these institutions, 1 each in Fukuoka, Ōsaka, Kyoto, and Nagoya. In addition, there are 7 governmental medical schools of university rank established by the prefectures. These schools are well organized and rank next to the medical faculties of the Imperial Universities. The following institutions are found within the region surveyed: Nagasaki Ikadaigaku, Kumamoto Ikadaigaku, Okayama Ikadaigaku, Kyōto Ikadaigaku.

Medical faculties of university rank are connected with 3 of the private universities in Tōkyō. There are furthermore 8 private medical schools of lower rank (according to other sources, 12) designated as Igaku Semmon Gakko, which may be translated as Medical Professional Schools. Graduates of these schools, some of which have fairly good standards, are admitted to medical practice but have somewhat less prestige than the graduates of the higher institutions. Among the Igaku Semmon Gakko there are two or three medical schools for women, 1 of which is in Ōsaka.

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According to latest available reports, there are 8 dental colleges in the whole of Japan, 1 governmental and 7 private. At least 2 of these latter are in the area surveyed, 1 in Ōsaka, and 1 in Kyūshū.

(5) Bacteriological laboratories.

In 1937 the total number of bacteriological laboratories for the whole of Japan proper was listed as 195, of which 145 were established by prefectural governments, 25 by cities and towns, and 25 by private individuals. This represented an increase of 2 over the preceding year. The number of bacteriological examinations made by these laboratories in 1937 was 4,446,393, showing an increase of 878,998 over the preceding year.

(6) Mineral springs.

There are many mineral springs, especially hot springs, in Japan. Cities, towns, and villages having such springs under their jurisdiction number 680. These hot spring resorts (Onsen) are widely used for cures and recuperation, the most common use being for bathing, including hot mud and sand baths. They thus play an important role in Japanese medicine and represent a great national institution of the country. The average annual visitors to these resorts number about 17,000,000 persons. Beppu in Kyūshū is one of the most famed spring resorts and was chosen by the Kyūshū Imperial University at Fukuoka for the location of its Institute for Balneologic Research and Treatment.

C. Medical personnel.

(1) Physicians.

Private medical practice forms the basis of the Japanese medical system. In order to supplement the system of private practice, a number of government organizations for medical treatment and non-profit-making dispensaries for the diagnosis and treatment of specific diseases, such as infectious diseases, tuberculosis, venereal diseases, leprosy, and mental diseases have been established.

There is no information available concerning the many changes in the number and distribution of medical practitioners due to the exigencies of war. Even the statistical data for the last years previous to the war are incomplete.

Graduates from institutions of university rank have the degree of "Gakushi" meaning "university graduate." Graduates of the lower ranking institutions are simply "physicians" (Ishi, Isha). In addition all graduates can obtain the degree of Doctor of Medicine (Igaku Hakushi or Igaku Hakase) by extensive postgraduate studies and submission of a thesis. This academic doctorate is taken only by a fraction of the total number of physicians. The Civil Affairs Handbook listed 62,140 physicians in Japan in 1938. For 1937 the figure of 8.64 physicians per 10,000 population is given, with 13.62 physicians per 10,000 population in cities and 5.66 physicians per 10,000 population in rural districts. The physicians are classified as follows:

CLASSIFICATION OF PHYSICIANS IN JAPAN, 1938

Graduates of Imperial Universities	22,952
Graduates of Recognized Schools	26,602
Women Graduates	3,951
Graduates of Foreign Universities	74
Women Graduates of Foreign Universities	7

Physicians passing examinations but not graduates of recognized medical colleges	8,554
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Total	62,140
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Within the area surveyed there are about 31,000 physicians or approximately 50% of all Japanese physicians. A similar rate presumably prevails for the other medical and sanitation personnel.

In remote rural areas there is a dearth of medical practitioners and the government has organized a service whereby doctors may be sent to such districts both in times of emergency and on regular visits. The government has also adopted a policy of subsidizing practitioners in towns and villages and of encouraging independent medical institutions as well as medical dispensaries attached to cooperative societies.

(2) Nurses.

In 1937 there were 124,402 nurses (295 male nurses) in the whole of Japan proper (89,684 in 1935); this figure corresponds to a ratio of 17.46 per 10,000 population. In addition there were about 5,000 public health nurses working in schools, factories, and child welfare centers. Qualification for this work requires a special course of training.

(3) Dentists.

The organization of the dental profession is similar to that of the medical practitioners. Prefectural Dental Societies are established in which membership is compulsory. These prefectural societies are combined to form the Japanese Dental Association. In 1938 there were 22,313 dentists in Japan. In 1937 there were 3.22 dentists per 10,000 population; 4.85 dentists per 10,000 city population; and 1.6 dentists per 10,000 rural population.

(4) Veterinarians.

There were in the whole of Japan proper 17,195 licensed veterinarians at the end of 1938.

(5) Pharmacists.

The total number of licensed pharmacists in the whole of Japan proper in 1939 is given as 28,766 (20,470 in 1932). Of these 18,214 dispensed medicines in pharmacies, 3,152 worked in hospitals, and 1,712 devoted full time to the sale of patent medicines. (No statement is made concerning the remainder.)

(6) Others.

A midwife in Japan must have completed a course at an approved school or training institute. In 1935, 59,560 were licensed (9.33 per 10,000 population).

There are 3 common traditional treatments used in Japan which still have many adherents among the rural population and the lower classes. These treatments are massage, acupuncture, and moxa. Acupuncture is a treatment involving pricking of aching spots with a needle; moxa is a cure involving the burning of bits of dried-up young leaves of Chinese wormwood on the skin, usually on the back.

D. Social service agencies.

(1) Japanese Red Cross Society.

This organization originated as a voluntary relief service which joined the Geneva Convention in 1886 as the Japanese Red Cross Society.

By Imperial Ordinance the Japanese Red Cross is required to assist in the health services of the Army and Navy under the supervision of the respective ministers. The president and vice-president of the Red Cross Society must be appointed by the Emperor upon the recommendation of the Ministers of the Army and Navy. The president of the Society is said always to be a prince of the Imperial Family. Headquarters of the Society are in Tōkyō and branches are established in each prefecture. In each branch a committee administers the activities of the Red Cross Society within the prefecture.

Red Cross relief personnel consists of managers, medical officers, pharmacists, nurses, and attendants. In time of peace the personnel is organized into a reserve and distributed throughout the Red Cross hospitals of Japan, to be mobilized upon the occurrence of disasters or the outbreak of war. Hospital supplies for relief in war or natural disasters are always held in readiness at National Headquarters and the local branches. In war time the inadequacy of the Medical Corps of the Army is met by the addition of Red Cross relief units held in reserve during peace time. Red Cross hospitals, hospital ships, and hospital trains, as well as ambulances, are taken over. The Red Cross thus becomes an integral part of the armed forces.

Periodic mobilizations of the entire Red Cross organization, lasting several days, were carried out every 3 years in connection with maneuvers of the Medical Corps of the Army and Navy before the war. During these periods the entire mobilized Red Cross personnel is administered by the armed forces.

In the anti-tuberculosis campaign the Red Cross has maintained clinics and dispensaries throughout Japan as well as clinics for prenatal and postnatal care and for infants' and children's health work. The local branches also provide for courses in hygiene available to the public.

(2) Health unions.

In cities, towns, and villages there are health unions (*eisei kumiai*, *eisei jigyo kumiai*) working in cooperation with the authorities in health matters. These cooperative societies proceed on their own initiative on the principle of mutual aid in matters pertaining to medical relief, prevention of infectious disease, and other health matters.

(3) Others.

Among relief associations concerned with public health matters the Salvation Army, the Japanese Association for the Prevention of Tuberculosis, the White Cross Society of Japan, and the Imperial Relief (charity) Association (Saiseikai) should be mentioned.

113. Diseases

A. Diseases of military importance.

(1) Dysentery (bacillary and amoebic).

In Japan bacillary dysentery is more common than amoebic. It tends to be more serious than bacillary infection in the United States because of a large number of infections with the Shiga strain (*Shigella dysenteriae*). Although figures concerning its incidence are unavailable at present, amoebic dysentery is said to be rare in comparison with its occurrence in China. The general use of human excreta as fertilizer would tend to spread amoebic as well as bacillary dysentery. TABLE

XI-2 shows the figures of dysentery (bacillary and amoebic, including ekiri) in the area surveyed.

TABLE XI-2
DYSENTERY (BACILLARY AND AMOEBIC, INCLUDING EKIRI) IN SOUTHWEST JAPAN, 1938

	CASES	DEATHS	CASES PER 10,000 POPULATION
<i>Kyūshū</i>			
Kagoshima	477	68	2.96
Miyazaki	413	171	4.78
Ōita	388	197	3.87
Kumamoto	1,789	625	12.71
Nagasaki	794	324	5.94
Saga	379	172	5.55
Fukuoka	5,664	1,215	19.55
<i>Shikoku</i>			
Kōchi	1,075	238	15.08
Ehime	540	229	4.58
Kagawa	869	302	11.46
Tokushima	1,082	250	14.70
<i>Chūgoku</i>			
Yamaguchi	1,998	676	16.32
Hiroshima	1,816	470	9.69
Okayama	925	346	6.79
Shimane	489	248	6.50
Tottori	220	96	4.48
<i>Kinki</i>			
Wakayama	343	88	3.88
Nara	178	33	2.80
Hyōgo	4,581	706	14.80
Ōsaka	10,648	1,967	22.35
Kyōto	2,346	517	13.07
Shiga	216	40	2.98
<i>Tōkaidō</i>			
Mie	768	336	6.48
Aichi	2,713	944	8.91
Gifu	1,039	478	8.28

(2) Diarrheas and enteritis.

Various forms of diarrhea and enteritis are reported from all parts of Japan. In some cases this classification may wrongly include cases of the more serious enteric diseases, notably bacillary dysentery. There is no doubt that various forms of "food poisoning" are common in this area due both to improper food storage and to uncleanness of food handlers. There are many unreported cases of these diseases and the incidence of mild diarrheas is great. Although not as serious as the preceding enteric diseases, these conditions tend to occur in outbreaks which may incapacitate a large number of persons at one time.

(3) Venereal diseases.

The venereal disease rate in Japan is fairly high. Gonorrhea is the most common affection, followed by chancroid and syphilis. Lymphogranuloma venereum also occurs but no reliable reports are available at the present time. Incidence and trend of venereal diseases are indicated by the following figures.

INCIDENCE OF VENEREAL DISEASES IN JAPANESE CONSCRIPTS, 1920 AND 1930

YEAR	SYPHILIS	GONORRHEA	CHANCROID	TOTAL	RATE PER 1,000
1920	2,196	6,975	2,434	11,605	22
1930	942	4,862	1,116	6,920	13

The government's intense campaign seems to have caused a marked decrease of venereal diseases. Although no reports on recent conditions are available at this time, the statement has been quoted that the incidence of venereal diseases among conscripts is approximately 1.2% in the present war.

Prostitution in Japan is controlled by the police who confine

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licensed prostitutes to assigned quarters. In the whole of Japan proper these quarters numbered 392 in 1938 with approximately 45,000 licensed prostitutes. Periodic health examinations revealed 59,454 instances of venereal disease. Prostitutes were admitted into the hospital an average of 1.3 times each during the year.

In addition to licensed prostitution there exists in Japan a widespread form of tacitly tolerated clandestine prostitution by waitresses in small drinking places as well as by waitresses in certain types of tea houses and by low class geishas in rural districts. Contrary to a widely held popular notion, geishas are not prostitutes (*joro*) but highly skilled dancers and entertainers with a somewhat liberal sex code whose performance does not officially nor necessarily include more intimate relations.

No reports are available on the venereal disease situation since the outbreak of the war. There is no reason to assume that in the area under consideration venereal disease rates differ significantly from the rates which prevail in the whole of Japan.

(4) Encephalitis.

Japanese summer or "B" encephalitis is found mainly in southwestern Japan where a number of cases are reported each year, especially from Fukuoka, Kagawa, and Okayama prefectures. The disease is characterized by high fever and beclouded consciousness and may be followed by various degrees of paralysis and other complications. The virus is believed to be transmitted by certain mosquitoes, and infection occurs from July to September. Sudden outbreaks which may affect a number of troops must be reckoned with. A serious epidemic was recorded in 1924 in the prefecture of Okayama and on Shikoku. The case fatality rate approached 60%. Those recovering underwent a long convalescence period. Another lesser epidemic was reported in the Okayama prefecture in 1937.

(5) Dermatological diseases.

Skin diseases, including various fungus infections, eczema, and scabies, are common throughout Japan. Among the fungus diseases, cheiropompholyx, an affection with watery vesicles on the palms and soles, is frequent. Various types of trichophytosis are also reported. The *Paederus* dermatitis is a peculiar skin disease caused by the toxin of a beetle.

B. Diseases of potential military importance.

(1) Endemic diseases.

(a) Typhus and other rickettsial diseases. There are 3 main typhus-like diseases occurring in Japan, epidemic typhus fever, endemic typhus fever, and tsutsugamushi. Epidemic or louse-borne typhus fever caused by *Rickettsia prowazekii* is transmitted by the common body louse, *Pediculus humanus corporis*. Although serious epidemics were recorded during the last century, the disease was not widespread before the war. Sporadic cases occurred, mostly in the northern prefectures outside the boundaries of the region under discussion. No deaths from typhus were reported from the whole of Japan proper in 1938. Under changed conditions new epidemics might break out. It must be noted in reading Japanese reports or translations that the Japanese use the word typhus (*abdominalis*) as in German for typhoid fever. Typhus is named *typhus exanthematicus*. Oversight of this fact may cause confusion.

Endemic typhus fever (murine typhus) is spread by rat fleas. This type occurs occasionally in the sea-ports, as infected rats are frequently found around docks, warehouses, and rice storehouses.

Tsutsugamushi (Japanese river fever, scrub typhus fever, mite typhus) is spread by the harvest mite *Trombidium* and is endemic along rivers in the mountain districts of Niigata, Akita, and Yamagata prefectures outside the area under discussion. Complete reliance cannot be placed on its reputed absence in the surveyed area as a spreading of this disease is not out of question.

(b) Malaria. Under ordinary conditions, malaria is not an important problem in Japan proper. In spring and summer the disease sometimes occurs but cases are not numerous.

The most important vector of malaria is *Anopheles hyrcanus sinensis*. The prevailing form of malaria is the tertian type. Quartan malaria occurs only in isolated cases and is said to be practically absent. Very few cases of the estivo-autumnal form, mostly affecting Korean residents in Japan, have been recorded.

The number of deaths from malaria in the whole of Japan proper fluctuated between 50 and 75 per year before the war in China (1937). More than 50% of these deaths occurred in Okinawa prefecture outside the boundaries of the area surveyed. At the beginning of the century annual deaths averaged around 400. Statistics covering the year 1938 record 207 deaths from malaria in Japan proper, of which 166 occurred in Okinawa prefecture. TABLE XI-3 gives figures of mortality from malaria.

TABLE XI-3
MORTALITY FROM MALARIA IN JAPAN, 1937 AND 1938
(EXCLUDING MILITARY PERSONNEL)

	NUMBER OF DEATHS IN JAPAN PROPER (including Okinawa prefecture)	NUMBER OF DEATHS IN OKINAWA PREFECTURE
1937	65	44
1938	207	166
	NUMBER OF DEATHS IN SOUTHWEST JAPAN	
	1937	1938
<i>Kyūshū</i>		
Kagoshima	—	1
Miyazaki	2	1
Kumamoto	1	1
Nagasaki	1	—
Saga	—	1
Fukuoka	1	6
<i>Shikoku</i>		
Kōchi	1	2
Kagawa	—	4
Tokushima	—	1
<i>Chūgoku</i>		
Yamaguchi	1	2
Hiroshima	—	8
Tottori	—	2
<i>Kinki</i>		
Hyōgo	1	1
Osaka	1	1
Kyōto	—	1
Shiga	2	—
<i>Tōkaidō</i>		
Mie	1	—
Gifu	1	—
Aichi	—	1
Total	13	33

It must be borne in mind that the malaria situation may gradually or suddenly change with the war conditions and that troops entering the area from malarious regions may cause the disease to assume dangerous proportions.

(c) *Cholera*. According to Japanese sources cholera occurs in Japan only by importation from China. Although in the past several fairly widespread epidemics have been recorded, they have been traced invariably to the entry of a single case through a port. The port of entry was often in the south of Japan, most commonly Nagasaki. Stringent measures, including quarantine, search for carriers, and cholera vaccination, succeeded in controlling and eliminating the epidemics. No cholera cases were reported in 1936; 57 cases with 20 deaths were recorded in 1937 for the whole of Japan proper, including cases in Hiroshima, Okayama, and Hyōgo prefectures. In 1939 no actual cases were imported but some carriers were. The disease is spread through contaminated water and food. In addition it is believed that the common fly is of particular importance as a mechanical vector of the cholera organism. The preventive measures controlling the disease may break down under the stress of war conditions so that proper precautions to prevent infections of troops are imperative.

(d) *Dengue*. Dengue or breakbone fever is a virus disease conveyed by *Aedes albopictus* and *Aedes aegypti*. It has been reported from Kyūshū, although the more severe epidemics seem to have been confined to Okinawa prefecture and Formosa. The disease is very seldom fatal but may incapacitate a large number of persons by sudden and explosive outbreaks.

(e) *Relapsing fever*. This disease is caused by the spirochete *Borrelia recurrentis* and is spread chiefly by the louse. Although it is said to occur in the area surveyed, no reliable reports as to its frequency are available. If present, its distribution should correspond approximately to that of epidemic typhus fever. The disease is characterized by febrile attacks and increasing weakness. In its usual form it is not fatal although a serious form with jaundice and a case fatality of about 50% exists. The disease is most apt to break out under conditions of crowding, undernourishment, and low hygienic standards.

(f) *Filariasis*. The filarial larvae migrate into the lymph channels, blocking these mainly through secondary tissue reactions. This may lead to a swelling of the scrotum and the legs, known as elephantiasis. Man is inoculated with mature larvae escaping into or onto human skin from the proboscis of infected mosquitoes, which serve as intermediate hosts of the organisms in endemic foci. These mosquitoes have previously become infected from ingesting the microfilariae of the organism swarming in the peripheral blood of actively infected human subjects, usually during the nighttime.

Wuchereria bancrofti is the only type reported in Japan proper. *Culex quinquefasciatus* (fatigans) and *Anopheles hyrcanus sinensis* are the main vectors of this disease; in addition several other mosquitoes, including *Aedes* species, are suspected.

The disease is found rather commonly in the area surveyed, especially in the prefectures of Kagoshima, Kumamoto, Nagasaki, Saga, and Kōchi.

(2) Diseases which may be introduced.

Plague. This extremely serious disease was introduced into

Japan from China in 1896. Several epidemics occurred until 1910. Since that time there have been no epidemics, but sporadic cases are occasionally reported. Several years may elapse without a single case.

Seaport prefectures are the prevailing place for plague, Nagasaki, Hyōgo, and Ōsaka being the most commonly affected in the area under discussion. The plague organism, *Pasteurella pestis*, is carried by rat fleas. Plague in Japan has been almost entirely bubonic in type except for an isolated small outbreak of pneumonic plague. Only the most extreme vigilance of the port authorities has kept the plague incidence within bounds. An outbreak occurring during a period of war emergency would become a military problem of first magnitude due to the widespread rat infestation.

C. Diseases of minor military importance.

(1) Typhoid and paratyphoid fever.

Typhoid and paratyphoid fever are extremely common throughout Japan. The incidence is especially high in the late summer and early fall. In the years before the war approximately 45,000 cases occurred yearly in the whole of Japan proper, with a reported case fatality rate of 10 to 22% depending on the locality. The rate of incidence is higher in cities and towns than in rural districts, the ratio being given as 10:7. A study of the origin of the infection over a long period of years showed that 21% were infected through drinking water, 18% through contaminated food, 30% through direct contact with a known case. TABLE XI-4 gives the figures for typhoid and paratyphoid in the area surveyed.

TABLE XI-4
CASES OF TYPHOID AND PARATYPHOID FEVER IN
SOUTHWEST JAPAN (1937-1938)

Typhoid Fever						
	1937			1938		
	CASES	DEATHS	CASES PER 10,000 POP.	CASES	DEATHS	CASES PER 10,000 POP.
<i>Kyūshū</i>						
Kagoshima	150	25	0.93	108	19	0.67
Miyazaki	126	17	1.48	99	20	1.15
Ōita	241	53	2.42	208	44	2.08
Kumamoto	422	69	3.01	251	45	1.78
Nagasaki	426	89	3.22	395	78	2.96
Saga	360	61	5.26	293	40	4.29
Fukuoka	1,618	285	5.68	1,943	253	6.71
<i>Shikoku</i>						
Kōchi	509	93	7.13	775	117	10.87
Ehime	799	131	6.80	854	154	7.24
Kagawa	523	56	6.93	469	85	6.18
Tokushima	343	66	4.67	451	68	6.13
<i>Chūgoku</i>						
Yamaguchi	422	64	3.48	370	67	3.02
Hiroshima	2,458	418	13.27	1,777	352	9.48
Okayama	598	117	4.42	734	133	5.39
Shimane	282	65	3.76	223	47	2.97
Tottori	250	37	5.09	342	51	6.96
<i>Kinki</i>						
Wakayama	755	157	8.60	638	117	7.21
Nara	338	65	5.36	406	81	6.39
Hyōgo	3,400	576	11.19	3,133	514	10.12
Ōsaka	3,433	724	7.44	4,075	888	8.55
Kyōto	1,025	177	5.81	1,261	188	7.03
Shiga	372	49	5.17	302	41	4.17
<i>Tōkaidō</i>						
Mie	506	117	4.23	540	119	4.56
Aichi	1,555	255	5.21	1,547	234	5.08
Gifu	833	172	6.69	571	103	4.55

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TABLE XI-4 (Continued)

Paratyphoid Fever

	1937			1938		
	CASES	DEATHS	CASES PER 10,000 POP.	CASES	DEATHS	CASES PER 10,000 POP.
<i>Kyūshū</i>						
Kagoshima	18	3	0.11	17	1	0.11
Miyazaki	17	2	0.20	8	-	0.09
Ōita	42	2	0.42	180	4	1.80
Kumamoto	72	3	0.51	46	2	0.33
Nagasaki	23	-	0.17	78	2	0.58
Saga	24	3	0.35	27	5	0.40
Fukuoka	210	10	0.74	998	12	3.44
<i>Shikoku</i>						
Kōchi	40	3	0.56	26	3	0.36
Ehime	20	3	0.17	21	3	0.18
Kagawa	21	1	0.28	22	-	0.29
Tokushima	27	9	0.37	47	5	0.64
<i>Chūgoku</i>						
Yamaguchi	42	1	0.35	23	-	0.19
Hiroshima	294	9	1.59	175	13	0.93
Okayama	39	1	0.29	15	1	0.11
Shimane	43	6	0.57	19	1	0.25
Tottori	14	1	0.29	26	2	0.53
<i>Kinki</i>						
Wakayama	32	2	0.36	49	3	0.55
Nara	10	2	0.16	7	-	0.11
Iyōgo	193	10	0.64	285	12	0.92
Osaka	335	43	0.73	211	22	0.44
Kyōto	61	4	0.35	150	12	0.84
Shiga	34	1	0.47	21	-	0.29
<i>Tōkaidō</i>						
Mie	43	7	0.36	72	5	0.61
Aichi	200	16	0.67	216	15	0.71
Gifu	136	7	1.09	63	5	0.50

(2) *Leptospirosis.*

Various forms of leptospirosis, especially Weil's disease (spirochetel jaundice) and the so-called Japanese 7-day fever, are reported from Japan. These diseases are spread in food or water contaminated by the urine of infected rats. Man contracts the disease by eating or drinking contaminated food or water and by swimming or wading in it. Weil's disease occurs generally from July to November, and only rarely in winter.

(3) *Rat-bite fever.*

This disease, known as sodoku in Japan, is an infection following the bite of a diseased rat. It has an incubation period of about 2 weeks and consists of febrile attacks accompanied by a bluish-red rash and a secondary inflammation at the site of the lesion. It is attended by severe neuralgic pains. The causative organism is *Borrelia muris* (*Spirocheta morsus muris*, *Spirillum minus*).

(4) *Pappataci fever.*

This is a virus disease spread by the sandfly *Phlebotomus papatasi*. It causes no fatalities but has a tendency to occur in sudden sharp outbreaks involving numerous persons at one time. During the period of convalescence the patient remains greatly weakened for a long time. The disease is likely to be found in Kyūshū, but reliable reports concerning its incidence are not available at present.

(5) *Schistosomiasis.*

The oriental blood fluke, *Schistosoma japonicum*, is common in various regions of Japan, including Kyūshū. The infection with the parasite may be acquired by drinking polluted water or by merely wading through or bathing in water infested with the parasite. The snail *Katayama nosophora* serves as intermediate host in Japan. The parasite also infects dogs, cats, rodents, cattle, and horses which thus become reservoirs of infection.

In the human body, the parasite is carried into the liver circulation. Rashes, fever, pain, and enlarged liver and spleen

result. Ordinarily the disease is confined to the rural population, notably rice farmers and boatmen, but infection with this parasite may, under combat conditions in areas affected, become a military medical problem.

(6) *Intestinal worm infections.*

Intestinal parasitism is extremely common in the entire area under discussion as well as throughout the entire Japanese Empire.

In 1937, 581,809 persons were examined under provisions of the law for the prevention of parasitic diseases. Of these 282,004 or 48% were found to carry parasitic eggs. Roundworm (*Ascaris*) carriers represented 83%, hookworm carriers, 22% of this total.

Ancylostoma duodenale, the old world hookworm, capable of causing severe anemia, prevails in the rural regions, where as many as 54% of the people may be infected in some areas. *Necator americanus*, the American hookworm, has also been reported.

Ascaris lumbricoides, the large intestinal roundworm, is another very common parasite infecting a high percentage of the population.

Cestodes or tapeworms are also frequent, especially *Taenia saginata*, the beef tapeworm, *Diphyllobothrium latum*, the broad fish tapeworm, and *Ligula mansoni*. Dwarf tapeworms, including *Hymenolepis nana* and the rat tapeworms *Hymenolepis diminuta* and *fraterna* which frequently infect man, are also fairly widespread. The hydatid worm, *Echinococcus granulosus*, is very rare. No reliable reports are available concerning the occurrence of the pork tapeworm, *Taenia solium*, and of the nematode worm, *Trichinella spiralis*, producing trichinosis. Both these worms seem to be of minor importance in Japan.

Other frequent intestinal nematodes or threadworms are the whipworm, *Trichuris trichiura*, the human pinworm, *Enterobius (Oxyuris) vermicularis*, and the Far Eastern threadworm, *Trichostrongylus orientalis*. These 3 parasites may either remain symptomless or cause only minor discomfort. Severe illness due to these forms is infrequent.

There are also some intestinal parasites among the trematodes or flukes:

The intestinal fluke *Metagonimus yokagawai* is found in fresh water fishes and causes diarrhea and possibly more severe local organic symptoms. Snails of the genus *Melania* are the intermediate hosts for this parasite and water pollution provides a continuous source of infection.

The intestinal fluke *Fasciolopsis buski* may, in severe cases, produce abscesses and acute intestinal obstruction. Generalized edema and severe abdominal pain together with toxic diarrheas are common symptoms.

Various snails serve as hosts for the immature forms. The infection in man is associated with the consumption of raw pods, roots, stems, or bulbs of various water plants in the regions where the molluscan hosts abound.

(7) *Liver and lung fluke infections.*

The liver fluke, *Clonorchis sinensis*, is found in various fresh water fishes. Snails of the species *Bithynia* represent the intermediate hosts. The adult worm reaches the bile passages of man, causing diarrhea and enlargement of the liver and edema. There is an endemic district of *Clonorchis* in Fukuoka prefecture, along the Onga-kawa and Chikugo-gawa.

The oriental lung fluke, *Paragonimus westermani*, is ac-

quired by eating infected crab or crayfish meat either raw, insufficiently cooked, or merely soaked in rice and salted. The intermediate host is provided by various snails of the genus *Melania*. Natural definitive hosts other than man include rodents, cats, and dogs. The eggs of the parasite, coughed up and either expectorated or swallowed and passed in the feces, are the source of reinfection for the intermediate hosts. Human pollution of the water is probably less important than that by reservoir hosts. In the definitive host the swallowed larvae pass from the intestine into the lungs where they reach maturity and cause tubercle-like infiltration of the lungs as well as abscesses.

(8) Tetanus.

Clostridium tetani is found throughout the region surveyed. In the year 1938, 1,775 deaths from tetanus were reported from the whole of Japan proper. There are no statistics available for the incidence of tetanus in Southwest Japan.

D. Diseases common among civil population.

(1) Respiratory and infectious diseases.

Pneumonia, influenza, diphtheria, whooping cough, measles, scarlet fever, cerebrospinal meningitis, poliomyelitis, smallpox, and chickenpox occur throughout the whole of Japan proper. The incidence of these diseases is said to compare with that of the more backward sections of the United States. Measles and chickenpox are definitely more common. At times cerebrospinal meningitis has occurred in large epidemics and tends to break out in the spring and early summer. Occasional cases of smallpox occur. Although compulsory vaccination is strictly enforced, a number of fishermen as well as boatmen living with their families on barges lead a nomadic life and often fail to be vaccinated.

(2) Enteric diseases.

Various forms of diarrhea and enteritis are reported from all parts of Japan proper. In some instances this classification wrongly includes many cases of the more important enteric diseases discussed above. There is no doubt that various forms of food poisoning are common in this area due both to lack of proper food storage methods and to the uncleanness of food handlers. There are many unreported cases of these diseases and the incidence of mild diarrhea is great. Although not as serious as the major enteric diseases the tendency of these conditions to occur in outbreaks may incapacitate simultaneously a large number of persons.

Ekiri is a disease resembling infantile dysentery; it is, nevertheless, a separate disease affecting principally children between two and six. Epidemics are frequent in summer and autumn.

(3) Tuberculosis.

This disease occurs in a great number of cases and in its many forms throughout Japan. In 1938, 148,827 deaths from tuberculous affections including 104,995 deaths from pulmonary tuberculosis were recorded for the whole of Japan proper. Both the human and bovine type occur in the regions where cattle are raised. Tuberculosis will probably be of little importance to military forces entering this area.

(4) Leprosy.

It is estimated that there are about 35,000 to 50,000 persons afflicted with leprosy in the whole of Japan proper. Within

Southwest Japan leprosaria are established in Kyūshū and Shikoku. Leprosy is presumably not an important disease to troops, as infection seems to be acquired only by prolonged close contact with affected persons. A few individuals may, however, contract it. Symptoms may not appear for as long as 5 to 10 years after infection.

(5) Trachoma and other eye diseases.

Trachoma is very common in the whole of Japan proper. It has been stated that approximately 15% of the young men examined for military service show some evidence of the disease. Trachoma is one of the important causes of blindness in Japan. In addition several types of acute conjunctivitis occur. Gonorrheal ophthalmia which may also result in blindness is not infrequent, coinciding with the high incidence of gonorrhea.

(6) Beriberi.

The peculiar diet of the Japanese, consisting often too exclusively of white rice, leads easily to outbreaks of the vitamin B₁ deficiency known as beriberi or kakke and characterized by polyneuritis and cardiac symptoms. Since the discovery of the nature of this disease and the introduction of dietary changes such as mixtures of rice and barley and incomplete hulling of the rice, the disease incidence has considerably diminished. However, in 1938 there were still 12,712 deaths in the whole of Japan as a result of beriberi.

E. Miscellaneous diseases.

(1) Actinomycosis.

Actinomycosis, a fungus infection which may affect the skin of the jaws and neck, the mucous membrane of the mouth, and also the lungs, liver, and intestine, is rare in Japan. Only approximately 12 cases are said to be reported throughout Japan proper each year.

(2) Yaws.

This disease, also known as frambesia, is a spirochetal infection in many respects similar to syphilis and found among people living under unhygienic conditions. It is mainly spread through contact with infected individuals. Although prevalent in Japanese Mandated Islands, it is very uncommon in Japan proper and does not represent an important military medical problem.

(3) Anthrax.

This disease is caused by *Bacillus anthracis* and is contracted by man from infected cattle, sheep, horses, hogs, and goats, either directly from the living animals or from the hides, wool, or other parts of the cadavers. It is characterized by ulceration and swelling at the point of infection. Rapid collapse and death will frequently ensue. A few cases are reported sporadically throughout Japan each year, but the infection is not apt to become a problem of military medical importance.

(4) Rabies.

Rigid quarantine regulations and antirabic inoculations have kept the incidence of rabies at a remarkably low level. In some years not a single case of rabies in man is reported. According to the Civil Affairs Handbook, there were 3 deaths from rabies in 1938, including 1 in Okayama and 1 in Hyōgo prefecture. The official Japanese Health Report, however, lists no cases of rabies in man.

~~Restricted~~**(5) Kala-azar.**

This serious disease is caused by the parasite *Leishmania donovani* and is transmitted to man by the bite of the sandfly *Phlebotomus papatasi*. It is marked by fever, progressive anemia, wasting, enlargement of the spleen and liver, and dropsy. Although fairly common in China, it is very rare in Japan.

(6) Diseases of cattle.

Diseases occurring among cattle and other livestock in Japan are brucellosis, cattle plague, foot and mouth disease, glanders, swine cholera, rabies, and bovine tuberculosis. Governmental measures are taken to keep these conditions under control and to prevent human infection. No data are available concerning the number of cases and the geographical distribution of these animal diseases. The following are a potential danger to man.

(a) *Brucellosis*. This condition, also known as undulant fever or Malta fever, is characterized by a succession of febrile relapses separated by fever-free intervals, profuse sweats, and arthritis. It is caused by *Brucella melitensis* from goats and *B. abortus* and *B. suis* from cattle and hogs. A recent paper states that 10 to 20% of the cattle in Japan are infected with *Brucella abortus*. The extent of undulant fever among the human population is still doubtful.

(b) *Foot and mouth disease*. This is an acute febrile condition marked by the eruption of vesicles on the oral mucous membranes and the skin of the digits. The disease, also known as epizootic stomatitis or epizootic aphthae, is caused by a filtrable virus and may be transmitted from ruminant animals to man.

(c) *Glanders*. This disease of horses, also known as farcy, is due to *Malleomyces mallei* and is communicable to man. It is marked by acute febrile symptoms accompanied by a purulent discharge from the nose and by the eruption of isolated nodules on skin and mucous membranes, breaking down to form deep ulcerations. With the exception of some rare chronic cases, the disease runs almost invariably an acute and fatal course in man.

Some forms of pseudoglanders, caused by different organisms, occur in horses, Japanese glanders being due to a yeast fungus, *Cryptococcus (Blastomyces) farciminosus*.

While occasional human infection with true glanders is recorded in Japan, the disease is not of great importance in the area surveyed. No reliable reports are available as to the infectiousness of pseudoglanders for man in Japan.

114. Recommendations

In addition to health and sanitary precautions ordinarily observed by the armed forces, the following recommendations are considered of special importance in the area under discussion:

A. Water supply.

All water including that from municipal supplies should be considered unsafe and should be used only after it has been treated and its purity proved by bacteriological tests.

B. Sewage.

With the exception of larger cities, sewage disposal systems may be regarded as non-existent. Hence, suitable plans must

be made for local waste disposal wherever bodies of troops may be stationed outside of cities with regular sewerage systems. Careful waste disposal is of especial importance in view of the prevalence of enteric diseases.

C. Control of malaria, filariasis, dengue, and encephalitis.

Although malaria is not very widespread in Southwest Japan, it remains a serious potential threat. In addition there is the danger of filariasis and dengue infection as well as of encephalitis. Thus, mosquito control will be of paramount importance during the summer months and should include:

1. Use of bed nets.
2. Screening of military buildings and use of mosquito sprays where needed.
3. Use of head nets, gloves, and other protective clothing during night operations in mosquito areas.
4. Liberal use of insect repellents.
5. Elimination of mosquito breeding.
6. Sufficient supply of antimalarial drugs for prophylactic treatment available for use whenever indicated.

D. Fly control.

Because of the prevalence of enteric diseases, fly control will be imperative during the summer months. Thorough screening of buildings, mess halls, kitchens, and latrines will be necessary. Careful attention should be given to garbage and manure disposal.

E. Typhus control.**(1) Louse-borne typhus.**

Although the presence of typhus is not certain, the presence of the disease should be suspected and provisions made for control of body lice. Enforcement of the utmost personal cleanliness possible under the circumstances is essential. Ample facilities for bathing and laundering are urgently necessary. Special delousing powder, to be dusted into the clothing, should be available in case lice prevail in certain areas. Typhus immunization is essential.

(2) Tsutsugamushi (scrub typhus).

Mites capable of spreading scrub typhus may be found in grass-covered areas along rivers. Whether or not the disease is found is uncertain but in view of its severity, preventive measures should be taken. Camp sites should be cleared by burning all grasses and shrubs. Long trousers, leggings, and high shoes have a protective value. Clothes should be changed at frequent intervals and suitable mite repellents used. Prophylactic inoculation is of no value.

F. Sandfly control.

There are reports suggesting that sandfly fever exists within this area. This disease may cause a high ineffective rate in military personnel. These insects are too small to be restrained by ordinary mosquito netting. Measures recommended are:

1. Use of bed nets of special sandfly mesh.
2. Use of insect repellent, issued by the Quartermaster, to protect troops from bites of sandflies. It may be applied to exposed parts of the body or put on the clothing as a light spray. One application is effective for three or four hours. Lights should be turned out at night in all screened quarters so as to avoid attracting these flies.
3. The spraying of metal screening with a mixture of kerosene and oil about once a week. While the screen remains moist

with this material, sand flies which attempt to pass through the mesh may be killed.

4. Choice of a camp site on high, dry land with good ventilation.

5. The clearance of all decaying vegetation and animal life from ground surrounding the camp. Crevices in buildings or in the ground may serve as breeding spots. Such spots should be filled or smoothed.

G. Plague control.

Rat control measures are desirable to guard against the introduction of plague.

H. Venereal disease control.

This will be of special importance in the area surveyed and an intense campaign of entertainment, education, and prophylaxis is imperative.

I. Control of schistosomiasis.

No bathing should be allowed in waters in which snails of the Katayama species live. Unnecessary wading through such water should be avoided if possible. The Japanese claim that snails live only in slightly acid water; thus, they claim to be able to destroy these snails by spreading lime on the banks of irrigation canals, ditches, and streams. Copper sulfate added to the water is also effective in controlling snails. Avoidance of bathing and wading in dubious inland water will also help to prevent leptospirosis.

J. Food.

All native produce should be considered contaminated and should be cooked before eating. Special care must be exercised in the storage and preparation of food in army camps. Troops should be cautioned as to the risk of eating native foods. Although raw fish (sashimi) has a taste similar to oysters and may be prepared in a rather appetizing manner in Japanese restaurants, under no circumstances should it be eaten as various intestinal worm infections may thus be acquired. Insufficiently cooked crabs and fish dishes may also infect individuals with flukes and other worms.

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